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IS 10236-14 (1986): Procedure for basic climatic and durability test for optical instruments, Part 14: Driving rain test [PGD 22: Educational Instruments and Equipment]

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IS : 10236 (Part 14) - 1986
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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 14 DRIVING RAIN TEST

UDC 681·7 : 620·193·23 (551·578·1)

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PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 14 DRIVING RAIN TEST

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(*Continued on page* 2)

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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 14 DRIVING RAIN TEST

0. FOREWORD

0.1 This Indian Standard (Part 14) was adopted by the Indian Standards Institution on 21 July 1986, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Fast development in the field of instruments had brought a significant change in their basic content and design. It has been felt over the years that IS : 2352-1963* does not cater for the present day needs of the instruments and is also not in line with the recent trends in climatic and environmental testing procedures to be adopted for improving their quality and reliability. It has, therefore, become necessary to have uniform and more rational testing procedures as far as possible. This series of standards on climatic and durability test (IS : 10236) has been prepared with this objective.

0.2.1 It is proposed to withdraw the existing Indian Standard (IS : 2352-1963*) as soon as the tests mentioned therein are covered in the new series of IS : 10236.

1. SCOPE

1.1 This standard (Part 14) covers the procedure for conducting driving rain test for optical instruments.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 10236 (Part 1)† shall apply.

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*Procedure for basic climatic and durability tests for optical instruments.

†Procedure for basic climatic and durability tests for optical instruments: Part 1 General.

3. OBJECT

3.1 To determine the suitability of optical instruments to withstand and operate under conditions of rain.

4. INITIAL MEASUREMENTS

4.1 The instrument shall be visually examined, and optically, electrically and mechanically checked as required by the relevant instrument specification.

5. TEST CHAMBER

5.1 A driving rain chamber meeting requirements of **5.1.1** to **5.1.5** shall be used for this test.

5.1.1 The chamber shall have 8 shower heads, four shower heads shall be directed downwards at an angle of 45° at each of the four uppermost corners of the central space where instrument shall be kept for test. The remaining four shower heads shall be directed horizontally towards the centre of the area on each side where the instrument shall be placed. The shower heads shall have arrangement so that they may be adjusted at a distance of 50 to 75 cm from the corners or the sides of the instrument.

5.1.2 Each shower head shall be capable of spraying fresh water under laboratory conditions at a static pressure of 200 kPa ± 15 percent and with a consumption of 450 litres ± 10 percent per hour.

NOTE — The static pressure shall be measured nearest to one shower head directed downwards and one shower head directed horizontally.

5.1.3 Each shower head shall have dimensions as given in Fig. 1 and shall provide a cone angle of approximately 35° as shown in Fig. 2.

5.1.4 It shall have provision to supply electric power to the specimen under test from external source.

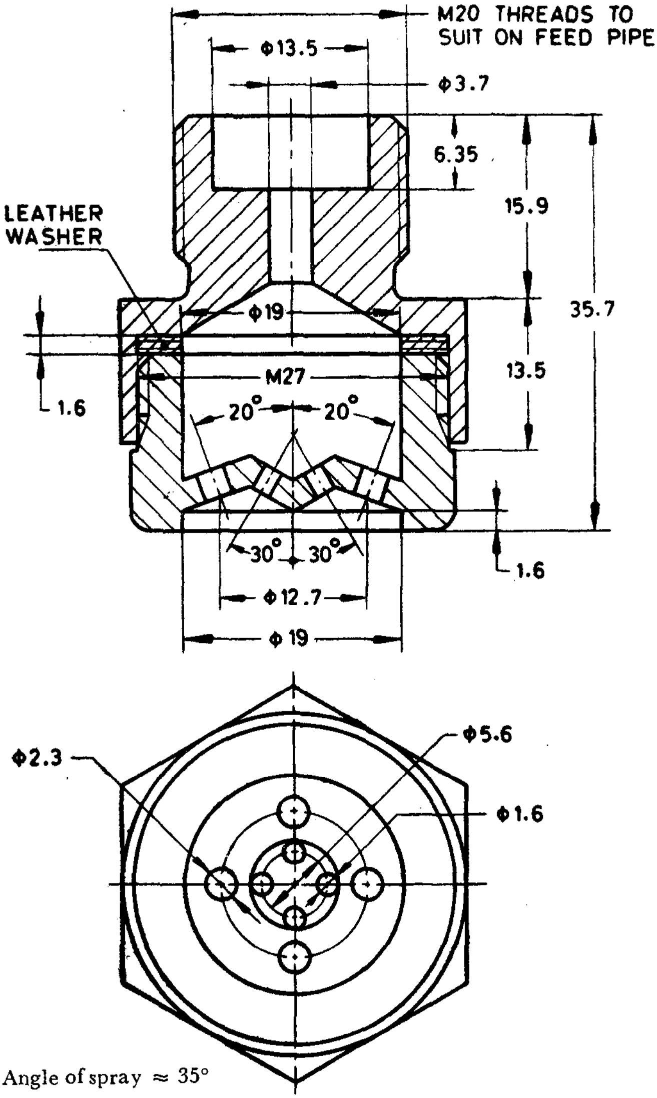
5.1.5 To see functioning of the instrument, if required, the chamber shall have a provision of water tight viewing window and light.

6. TEST SEVERITY

6.1 The severity indicated by the number of shower heads and water spray duration shall be as specified in the relevant instrument specification. The value may be selected from those given below:

a) Spraying for one hour using eight shower heads, and

b) Spraying for one hour using four shower heads directed downwards at an angle of 45°.



Angle of spray ≈ 35°

All dimensions in millimetres.

Fig. 1 Dimensions for Shower Head

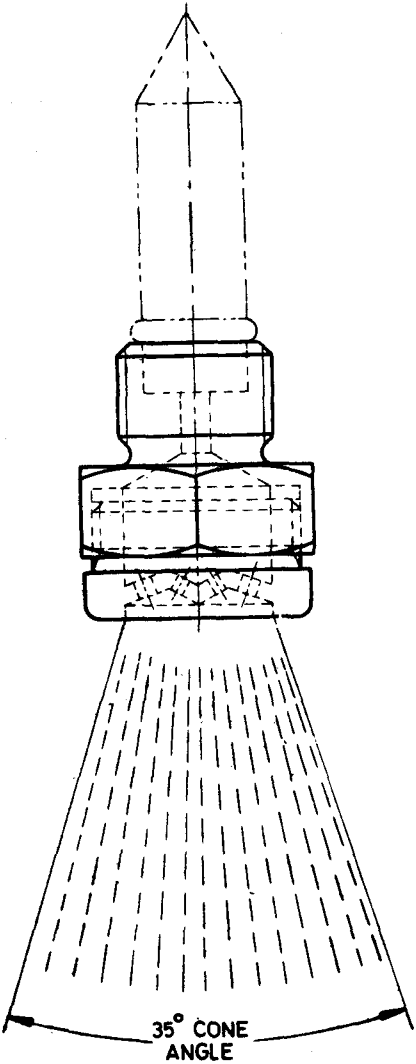


FIG. 2 SHOWER HEAD

7. TEST PROCEDURE

7.1 The instrument shall be subjected to this test in the unpacked condition and in its normal mounting position, unless otherwise specified in the relevant instrument specification.

7.2 Clean water shall be sprayed at a static pressure of 200 kPa ± 15 percent according to the test severity given in **6.1**. The consumption of water from each shower head shall be 450 litre ± 10 percent per hour.

7.3 If required in the relevant instrument specification the specimen shall be electrically operated during conditioning.

7.4 At the conclusion of the period specified the instrument shall be removed from the chamber and its external surfaces shall be dried by wiping or by applying a gentle blast of air at room temperature, unless otherwise specified in the relevant instrument specification.

7.5 Recovery — The instrument shall then be allowed to remain under the standard atmospheric conditions for recovery for not less than one hour nor more than two hours.

8. FINAL MEASUREMENTS

8.1 After recovery, the instrument shall be visually examined for ingress of water to the interior and fogging of optical surfaces and its performance shall also be checked in accordance with the relevant instrument specification.

9. DETAILS TO BE GIVEN IN RELEVANT INSTRUMENT SPECIFICATION

9.1 The relevant instrument specification shall state the following for carrying out this test:

a) Initial observations/measurements;
b) Test severity;
c) Mounting position for the instrument, if other than specified;
d) Operation during conditioning, if required;
e) Drying procedure, if other than specified;
f) Final observations/measurements; and
g) Any deviation from the normal procedure.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1\ \mathrm{N} = 1\ \mathrm{kg.m/s^2}$
Energy	joule	J	$1\ \mathrm{J} = 1\ \mathrm{N.m}$
Power	watt	W	$1\ \mathrm{W} = 1\ \mathrm{J/s}$
Flux	weber	Wb	$1\ \mathrm{Wb} = 1\ \mathrm{V.s}$
Flux density	tesla	T	$1\ \mathrm{T} = 1\ \mathrm{Wb/m^2}$
Frequency	hertz	Hz	$1\ \mathrm{Hz} = 1\ \mathrm{c/s}\ (\mathrm{s^{-1}})$
Electric conductance	siemens	S	$1\ \mathrm{S} = 1\ \mathrm{A/V}$
Electromotive force	volt	V	$1\ \mathrm{V} = 1\ \mathrm{W/A}$
Pressure, stress	pascal	Pa	$1\ \mathrm{Pa} = 1\ \mathrm{N/m^2}$